

# PATENT ABSTRACTS OF JAPAN

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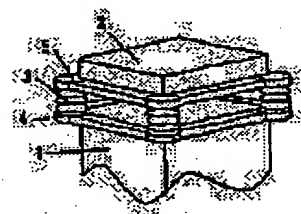
(72)Inventor : ABE YOSHIHIRO

## (54) MECHANISM FOR ADJUSTING AND FIXING OPTICAL ELEMENT

### (57)Abstract:

**PURPOSE:** To surely fix a solid-state image pickup element on the emitting surface of a color separation prism so that their positions can be three-dimensionally adjusted by a simple constitution, and to prevent the running-off of excess adhesive by bonding and fixing a fitting member with the adhesive injected inside a fixing member.

**CONSTITUTION:** The 1st fitting member 4 fixed on an optical element such as the color separation prism 1, the 2nd fitting member 5 fixed on a photoelectric element such as the solid-state image pickup device 2, and plural hollow bellows-like fixing members 3 which can be elongated and contracted and are provided between the 1st and the 2nd fitting members 4 and 5 are disposed. The 1st and the 2nd fitting members 4 and 5 are bonded and fixed with the adhesive injected inside the member 3 in a state where they are appropriately and positionally adjusted. Then, in such a simple positional adjusted state that a space is just regulated so as not to get large, the adhesive is injected in the member 3, the member 3 is elongated and contracted in a direction other than a space direction by the injection amount or the injection pressure of the adhesive, and the element 2 is stuck and fixed at a specified position.



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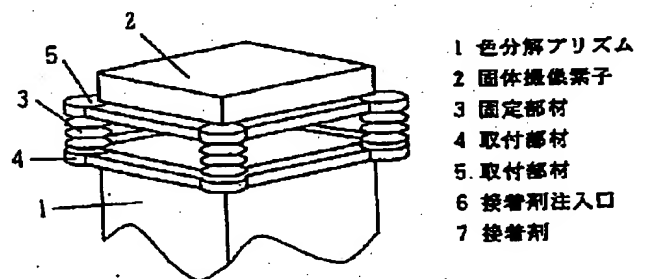
(54) 【発明の名称】 光学素子の調整固定機構

(57) 【要約】

【目的】 本発明は、簡素で容易に位置決めおよび固定を可能とする色分解プリズムと固体撮像素子の固定調整機構を提供する。

【構成】 本発明は、色分解プリズムに接着された取付部材と固体撮像素子に接着された取付部材との間を中空で蛇腹形状を持つ固定部材により接着固定する。

【効果】 本発明の構成によれば、簡素な構成で接着剤が流出することなく、3次元的に位置調整が可能で、確実に固体撮像素子を色分解プリズムの出射面に接着固定できる。



(2)

## 【特許請求の範囲】

【請求項1】色分解プリズムの光出射面と固体撮像素子との接合等の光学素子の調整固定機構において、前記色分解プリズム等の光学素子に固設された第1の取付部材と、前記固体撮像素子等の光電素子に固設された第2の取付部材と、前記第1の取付部材と第2の取付部材との間に設けられた複数の中空で伸縮可能な蛇腹形状の固定部材とを具備し、適正に位置調整された状態で前記第1の取付部材と第2の取付部材とを前記固定部材の内部に注入された接着剤により接合固定されることを特徴とする光学素子の調整固定機構。

【請求項2】前記固定部材に注入する接着剤の注入圧もしくは注入量によって前記固定部材の伸縮状態を調整し、前記色分解プリズム等の光学素子に対する前記固体撮像素子等の光電素子の姿勢を調整する事を特徴とする請求項1記載の光学素子の調整固定機構。

【請求項3】前記固定部材が紫外線を透過する材料で構成され、前記接着剤が紫外線硬化樹脂接着剤であることを特徴とする請求項1ならびに請求項2記載の光学素子の調整固定機構。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、光学素子の調整固定機構に関し、特に色分解プリズムの光出射面に固体撮像素子を位置調整して接着固定する光学素子の調整固定機構に関する。

## 【0002】

【従来の技術】近年、固体撮像素子の技術は著しい発展を遂げ、ビデオカメラの撮像素子の主流は撮像管から固体撮像素子に移行してきた。さらに最近では1個の固体撮像素子を用いた単板式のビデオカメラに比べ、高い性能を得るために2個あるいは3個の固体撮像素子をプリズムに貼り合わせた2板あるいは3板のビデオカメラが製造されるようになってきた。この2板、3板のビデオカメラではプリズムに貼り合わせる際に高精度の位置合わせが要求される。

【0003】この面の従来技術としては次のようなものが提案されている。すなわち、図3は3板式を例とする従来の色分解プリズムと固体撮像素子の接合機構を示す概略図であり、図4は色分解プリズムの出射面と固体撮像素子との接合部を示す概略図である。固体撮像素子2は色分解プリズム1の所定部分に設置され、かつ固体撮像素子2の対向する2側面には固定部材3が配置されている。固定部材3は固体撮像素子2との接触部および色分解プリズム1との接触部に塗布された接着剤7を硬化させて固定している。

## 【0004】

【発明が解決しようとする課題】しかしながらこれら従来の技術においては、複雑な機構を持つ位置調整装置であらかじめ位置決めおよび調整しておくことが必要で

あり、かつ接着剤を塗布する際に機械的接触等により位置ずれを起こし、また接着剤が不必要な部分にまで流出してしまうという問題がある。

## 【0005】

【課題を解決するための手段】本発明は、従来技術のこれらの問題点を解決することを目的とし、色分解プリズムの光出射面と固体撮像素子の接合等の光学素子の調整固定機構であって、前記色分解プリズム等の光学素子に固設された第1の取付部材と、前記固体撮像素子等の光電素子に固設された第2の取付部材と、前記第1の取付部材と第2の取付部材との間に設けられた複数の中空で伸縮可能な蛇腹形状の固定部材とを配設し、適正に位置調整された状態で前記第1の取付部材と第2の取付部材とを前記固定部材の内部に注入された接着剤により接合固定される光学素子の調整固定機構を提供する。

【0006】さらに本発明は、前記固定部材に注入する接着剤の注入圧もしくは注入量によって前記固定部材の伸縮状態を調整し、前記色分解プリズム等の光学素子に対する前記固体撮像素子等の光電素子の姿勢を調整する光学素子の調整固定機構を提供する。

【0007】さらに本発明は、前記固定部材が紫外線を透過する材料で構成され、前記接着剤は紫外線硬化樹脂接着剤である光学素子の調整固定機構を提供する。

## 【0008】

【作用】本発明の光学素子の調整固定機構によれば、伸縮可能な蛇腹形状で内部が空洞な固定部材が色分解プリズムと固体撮像素子との位置関係を固定した状態、特に間隔が大きくなるように規制しておくだけの簡単な位置調整状態で、固定部材に接着剤を注入し、その注入量または注入圧力によって固定部材が間隔方向以外の方向に伸縮し、固体撮像素子を所定の位置に接着固定する。

## 【0009】

【実施例】以下図面を用いて本発明の実施例を説明する。図1は本発明の実施例の構成の概略図であり、図2は固定部材部分の拡大図である。図において同じ部位は同じ符号で示し、1は色分解プリズム、2は固体撮像素子、3は固定部材、4は色分解プリズム等の光学素子に固設された第1の取付部材、5は固体撮像素子等の光電素子に固設された第2の取付部材、6は接着剤注入口である。

【0010】つぎに、このような構成における動作について説明する。図1において、第1の取付部材4と第2の取付部材5はそれぞれ色分解プリズム1および固体撮像素子2に接着固定され、第1の取付部材4と第2の取付部材5との間で、かつ4隅に固定部材3を挟み接着剤により固定される。

【0011】図2は固定部材3と第1の取付部材4と第2の取付部材5との接合部分の拡大図であり、第1の取付部材4および第2の取付部材5に接着固定された固定

(3)

部材 3 は、内部が空洞で紫外線を透過する材質ででき  
 おり、その蛇腹形状が最も折り畳んだ状態、つまり最も  
 縮んだ状態で、接着剤注入口 6 から紫外線硬化樹脂接着  
 剤を注入し、それにともない固定部材 3 は主に一方に  
 膨張を始める。この接着剤の注入は 4 つの固定部材 3 に  
 おいて同時に独立して行い、固体撮像素子 2 が自由な姿  
 勢をとれるようにする。さらに注入を続け固体撮像素子  
 2 を所望の位置に調整し、固定部材に紫外線を透過させ  
 接着剤を硬化させる。従って接着剤の注入と共に固体撮  
 像素子 2 の位置決めができ、接着剤の硬化にともない色  
 分解プリズム 1 と固体撮像素子 2 を接着固定できる。

【0012】

【発明の効果】以上説明したように本発明の構成ならび  
 に方法によれば、簡単な構成で 3 次元的に位置調整が可  
 能で、確実に固体撮像素子を色分解プリズムの出射面に

固定でき、余分な接着剤の流出もない。

【図面の簡単な説明】

【図 1】 本発明の実施例の構成の概略図。

【図 2】 本発明の実施例の色分解プリズムと固体撮像素子の接合部の部分拡大略図。

【図 3】 従来の 3 板式の色分解プリズムと固体撮像素子の接合機構を示す概略図。

【図 4】 従来の色分解プリズムと固体撮像素子の接合部を示す概略図。

【符号の説明】

1 色分解プリズム

2 固体撮像素子

3 固定部材

4 第 1 の取付部材

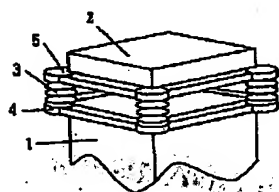
材

5 第 2 の取付部材

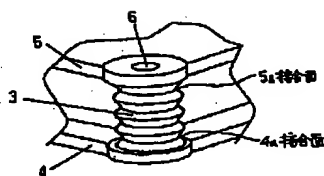
6 接着剤注入口

7 接着剤

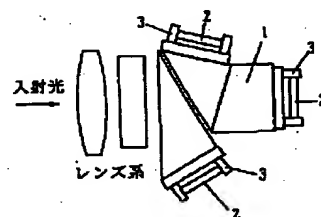
【図 1】



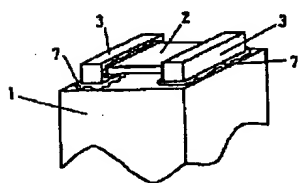
【図 2】



【図 3】



【図 4】



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**CLAIMS**

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[Claim(s)]

[Claim 1] In the adjustment fixed device of optical elements, such as junction to the optical outgoing radiation side of color-separation prism, and a solid state image pickup device The 1st mounting member fixed to optical elements, such as said color-separation prism, and the 2nd mounting member fixed to photoelectric elements, such as said solid state image pickup device, The holddown member of the bellows configuration which can be expanded and contracted in two or more hollow prepared between said 1st mounting member and the 2nd mounting member is provided. The adjustment fixed device of the optical element characterized by carrying out junction immobilization by the adhesives into which said 1st mounting member and the 2nd mounting member were poured inside said holddown member where positioning is carried out proper.

[Claim 2] The adjustment fixed device of the optical element according to claim 1 characterized by for the injection pressure or injection rate of the adhesives poured into said holddown member adjusting the flexible condition of said holddown member, and adjusting the position of photoelectric elements, such as said solid state image pickup device to optical elements, such as said color-separation prism.

[Claim 3] Claim 1 which consists of ingredients with which said holddown member penetrates ultraviolet rays, and is characterized by said adhesives being ultraviolet-rays hardening resin adhesives, and the adjustment fixed device of an optical element according to claim 2.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] About the adjustment fixed device of an optical element, especially this invention justifies a solid state image pickup device in the optical outgoing radiation side of color-separation prism, and relates to the adjustment fixed device of the optical element which carries out adhesion immobilization.

[0002]

[Description of the Prior Art] The technique of a solid state image pickup device accomplishes remarkable development in recent years, and the mainstream of the image sensor of a video camera has shifted to the solid state image pickup device from the camera tube. Furthermore, recently, compared with the veneer-type video camera which used one solid state image pickup device, in order to obtain the high engine performance, the video camera of two plates which stuck two pieces or three solid state image pickup devices on prism, or three plates has come to be manufactured. The video camera of these two plates and three plates requires the alignment of high degree of accuracy, in case it sticks on prism.

[0003] The following is proposed as a conventional technique of this field. That is, drawing 3 is the schematic diagram showing the splicing-machine style of the conventional color-separation prism and a conventional solid state image pickup device which makes 3 plate type an example, and drawing 4 is the schematic diagram showing the joint of the outgoing radiation side of color-separation prism, and a solid state image pickup device. The holddown member 3 is arranged in two side faces in which a solid state image pickup device 2 is installed in the predetermined part of the color-separation prism 1, and a solid state image pickup device 2 counters. A holddown member 3 stiffens the adhesive: 7 applied to the contact section with a solid state image pickup device 2, and the contact section with the color-separation prism 1, and is fixed.

[0004]

[Problem(s) to be Solved by the Invention] However, in these Prior arts, it is required to position and adjust beforehand with positioning equipment with a complicated device etc., and in case adhesives are applied, there is a problem that a lifting and adhesives will flow a location gap even into an unnecessary part by mechanical contact etc.

[0005]

[Means for Solving the Problem] The 1st mounting member which is the optical outgoing radiation side of color-separation prism, and the adjustment fixed device of optical elements, such as junction of a solid state image pickup device, and was fixed to optical elements, such as said color-separation prism, for the purpose of this invention solving these troubles of the conventional technique, The holddown member of the bellows configuration which can be expanded and contracted in two or more hollow prepared between the 2nd mounting member fixed to photoelectric elements, such as said solid state image pickup device, and said 1st mounting member and the 2nd mounting member is arranged. The adjustment fixed device of the optical element by which junction immobilization is carried out with the adhesives into which said 1st mounting member and the 2nd mounting member were poured inside said holddown member where positioning is carried out proper is offered.

[0006] Furthermore, this invention offers the adjustment fixed device of an optical element in which the injection pressure or injection rate of the adhesives poured into said holddown member adjusts the flexible condition of said holddown member, and the position of photoelectric elements, such as said solid state image pickup device to optical elements, such as said color-separation prism, is adjusted.

[0007] Furthermore, this invention consists of ingredients with which said holddown member penetrates ultraviolet ray; and said adhesives offer the adjustment fixed device of the optical element which is ultraviolet-rays hardening resin adhesives.

[0008]



[Function] According to the adjustment fixed device of the optical element of this invention, a holddown member expands and contracts in the direction of [ other than the spacing direction ] with the injection rate or transfer pressure, and in the state of easy positioning to regulate, adhesives are poured into a holddown member, and adhesion immobilization of the solid state image pickup device is carried out at a position so that the condition to which the holddown member [ cavity / interior ] fixed the physical relationship of color-separation prism and a solid state image pickup device in the bellows configuration which can be expanded and contracted, especially spacing may not become large.

[0009]

[Example] The example of this invention is explained using a drawing below. Drawing 1 is the schematic diagram of the configuration of the example of this invention, and drawing 2 is the enlarged drawing of a holddown-member part. In drawing, the same sign shows the same part, and the 1st mounting member by which a solid state image pickup device and 3 were fixed to the holddown member, and 4 was fixed [ 1 ] to optical elements, such as color-separation prism, for color-separation prism and 2, the 2nd mounting member by which 5 was fixed to photoelectric elements, such as a solid state image pickup device, and 6 are adhesives inlets.

[0010] Below, the actuation in such a configuration is explained. In drawing 1, adhesion immobilization is carried out, and the 1st mounting member 4 and the 2nd mounting member 5 are fixed to the color-separation prism 1 and a solid state image pickup device 2 by four corners with adhesives on both sides of a holddown member 3, respectively, while the 1st mounting member 4 and the 2nd mounting member 5.

[0011] Drawing 2 is the enlarged drawing for a joint of a holddown member 3, the 1st mounting member 4, and the 2nd mounting member 5, and the holddown member 3 by which adhesion immobilization was carried out to the 1st mounting member 4 and the 2nd mounting member 5. The interior is made of the construction material which penetrates ultraviolet rays in a cavity, ultraviolet-rays hardening resin adhesives are poured in from the adhesives inlet 6, and a holddown member 3 mainly begins expansion in the condition which the bellows configuration folded up most, i.e., the condition of having been shrunken most, to an one direction in connection with it. Impregnation of these adhesives is simultaneously performed independently in four holddown members 3, and a solid state image pickup device 2 enables it to take a free position. Furthermore continue impregnation, adjust a solid state image pickup device 2 to a desired location, a holddown member is made to penetrate ultraviolet rays, and adhesives are stiffened. Therefore, positioning of a solid state image pickup device 2 can be performed with impregnation of adhesives, and the adhesion immobilization of the color-separation prism 1 and the solid state image pickup device 2 can be carried out with hardening of adhesives.

[0012]

[Effect of the Invention] As explained above, according to the configuration and approach of this invention, positioning is possible in three dimension with an easy configuration, a solid state image pickup device can certainly be fixed to the outgoing radiation side of color-separation prism, and there is also no runoff of excessive adhesives.

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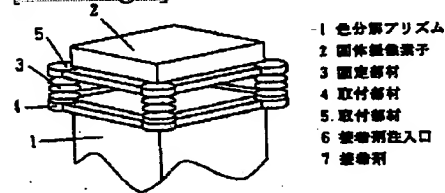
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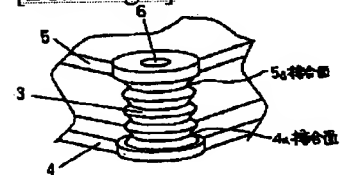
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## DRAWINGS

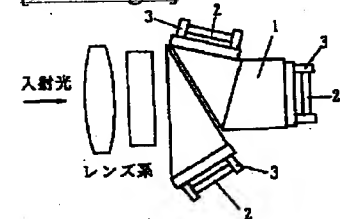
[Drawing 1]



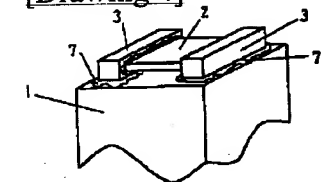
[Drawing 2]



[Drawing 3]



[Drawing 4]



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